

Variations2

The Indiana University Digital Music Library

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PART I

Overview and Update

Variations2: Digital Music Library

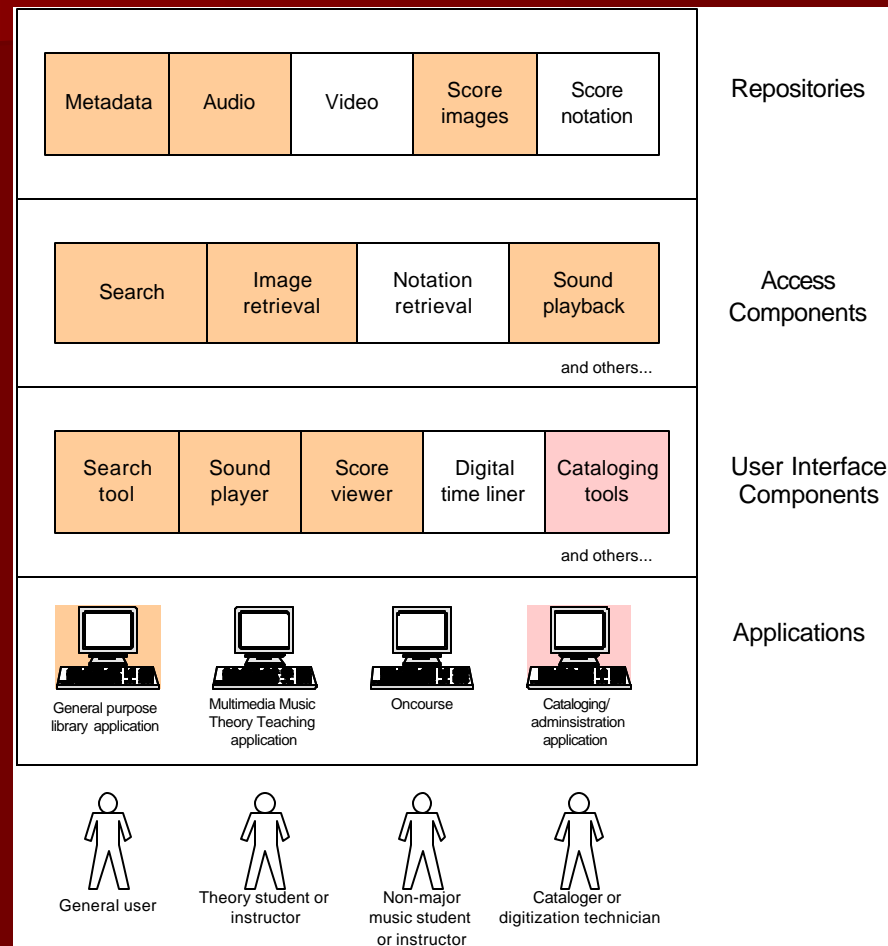
Four-year project

- Based on Indiana University's original Variations digital library application
- Started October 1, 2000
- Funding from NSF Digital Libraries Initiative Phase 2 (DLI2) program
- Interdisciplinary team of investigators
 -  Faculty from Music, Information Science, Informatics, Law, Computer Science
 -  Librarians and technologists from IU Libraries, University Information Technology Services
- Implementation at IU Bloomington and Indianapolis campuses, and 7 satellite sites

Variations2: Project Goals

- ✍ Develop multiple user applications on a single foundation of content and technology (e.g., music library services, music education)
- ✍ Develop a software system that integrates music in multiple media and formats: audio, video, score images, score notation
- ✍ Provide users access to a multimedia collection of music in a variety of formats and musical styles
- ✍ Provide a basis for digital library research (e.g., usability, intellectual property, metadata)

Variations2: System Architecture



Variations2: Accomplishments

- ✍ Completed preliminary usability studies
- ✍ Created and documented metadata model
- ✍ Analyzed and documented framework of rights and exceptions in copyright law
- ✍ Designed and developed Version 1.0 of the Variations2 software
- ✍ Developed specifications and prototypes for instructional software
- ✍ Organized and hosted Second Annual International Symposium on Music Information Retrieval (ISMIR 2001), October 001, at Indiana University, Bloomington

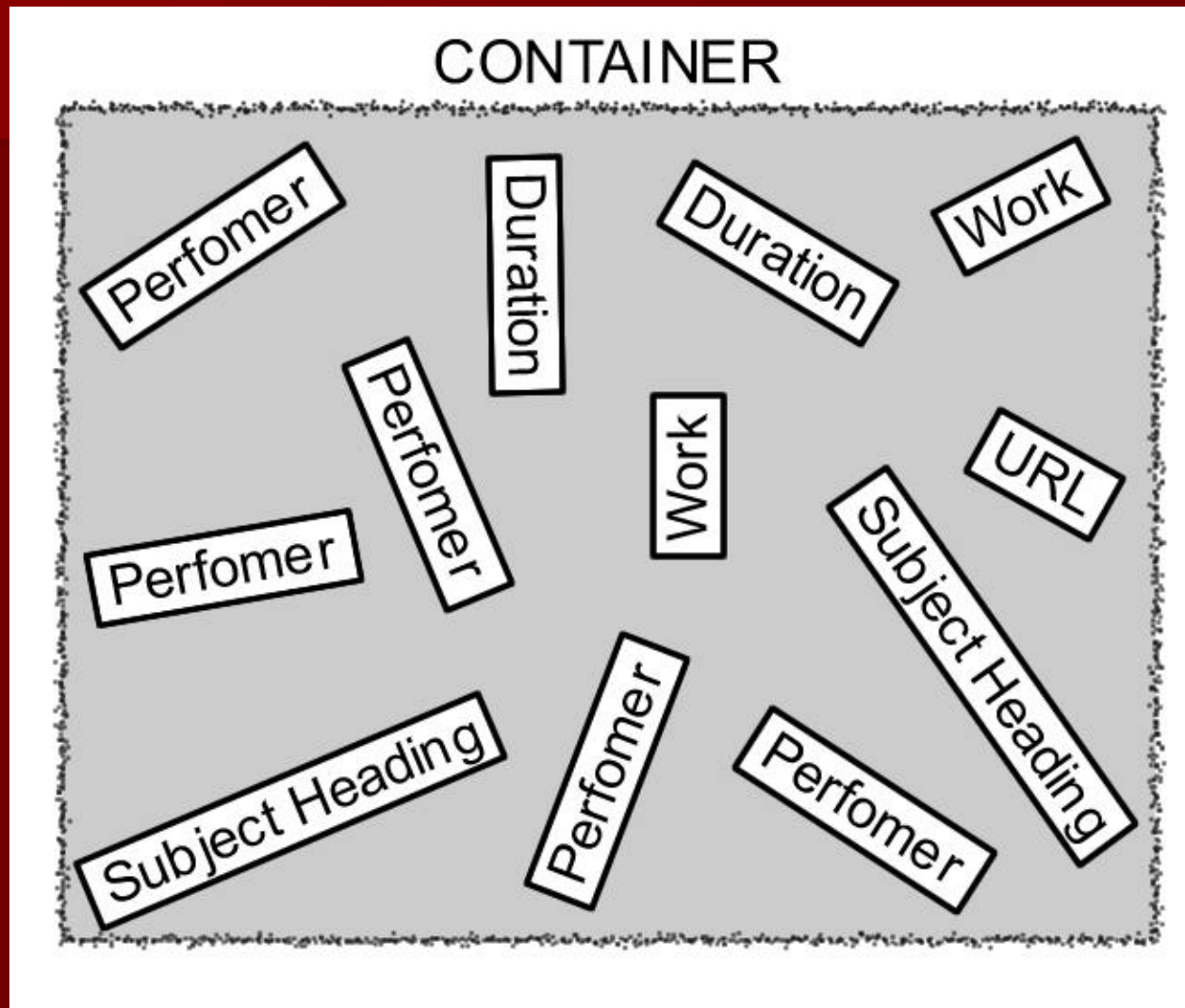
PART II

Metadata

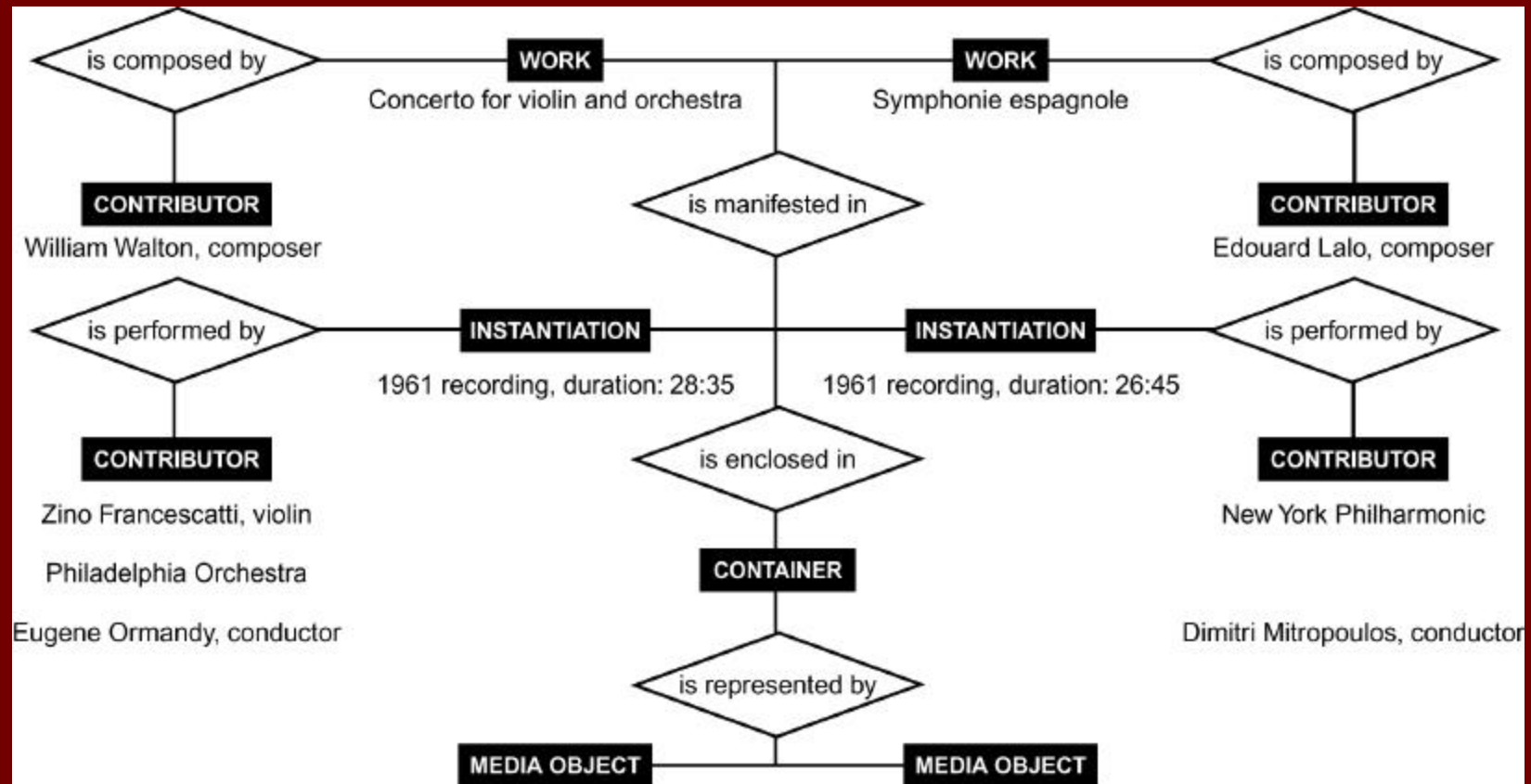
From MARC to Variations2 Metadata

- ✍ Uses data from traditional library catalog records
 - Bibliographic records
 - Authority records
- ✍ Addresses weaknesses of traditional records for digitized representations of music
 - Lack of structural and administrative metadata
 - Limits of conventional online catalog
 - Pre-coordinated, multi-faceted headings
 - Weak relationships between fields describing separate works
 - Insufficient links between multiple versions of the same work

Container-Centered MARC record



Work-centered Variations2 Data Model



Variations2: Metadata Design

- ✍ Represent relationships in data model
 - Works (musical compositions)
 - Instantiations (recordings or scores of individual work)
 - Containers (entire recordings, scores)
 - Media Objects (sound files, image files, notation files, etc.)
 - Contributors (performers, conductors, composers)
 - Other complexities: relationships between works
- ✍ Enable improved search and navigation
 - find related items: scores and recordings of the same work
- ✍ Structural metadata to support synchronization
 - sound playback (e.g., time offset) and score display (e.g., musical measure, published score page)

Significance & Potential Impact of Variations2 Metadata

- ✍ Domain-specific environment
- ✍ User-testing
- ✍ Practicality of research-level metadata
- ✍ Interoperability
- ✍ Endorsement of music communities
- ✍ Collaboration and sharing

PART III

Music Learning

Music Teaching Tools

- ✍ Audio
- ✍ Music score images
- ✍ Editable notation
- ✍ Other music visualizations (tables, diagrams)
- ✍ Static text
- ✍ Editable text

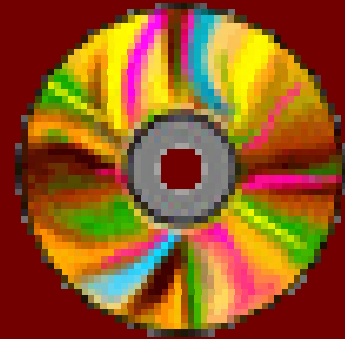
Picture 1: Traditional Classroom

Audio

- check out CD from library
- play in compact disc player

Drawbacks

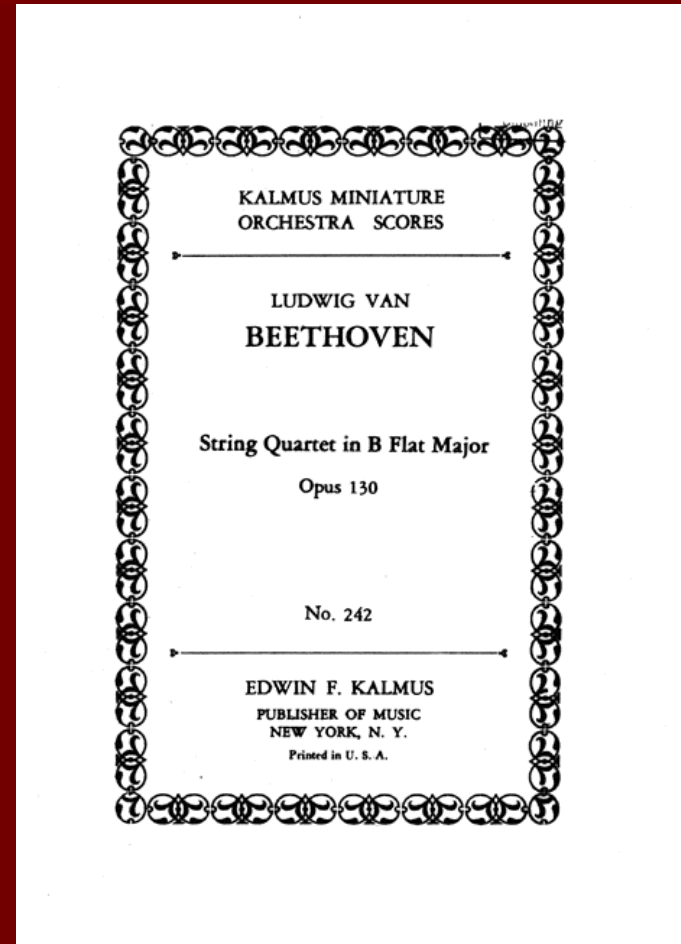
- requires library visit
- hard to cue up and play excerpts



Picture 1: Traditional Classroom

- ✍ Musical score
 - check out from library
 - make transparencies
 - annotate with pen

- ✍ Drawbacks
 - slide shuffling
 - poor visibility for large scores
 - marking pens messy



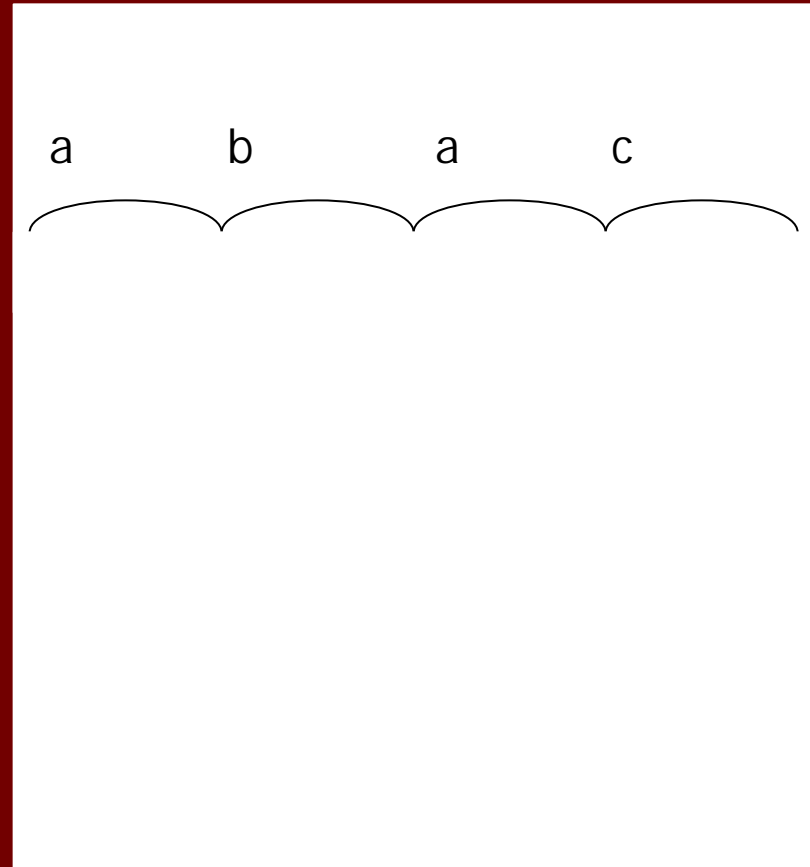
Picture 1: Traditional Classroom

Other visual formats

- Form diagram
- tables
- Use transparency and pen or chalkboard

Drawbacks

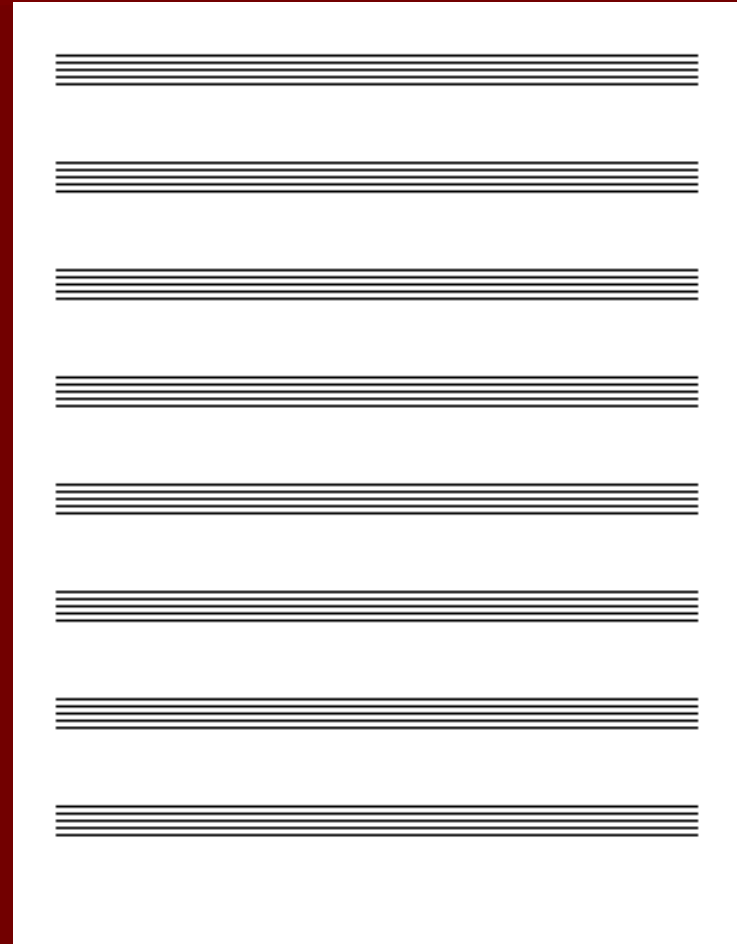
- connection to audio and score not clear



Picture 1: Traditional Classroom

- ✍ Editable notation
 - transparency with lines and pen
 - or chalk board

- ✍ Drawbacks
 - always messy
 - not persistent
 - hard to read



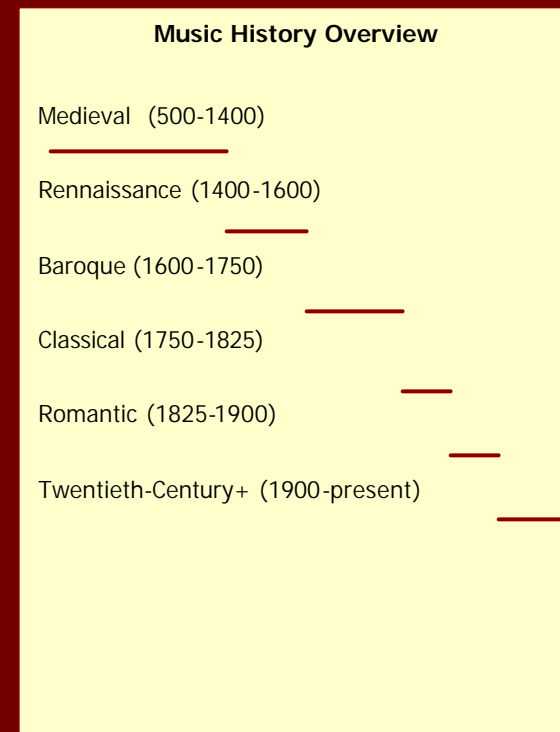
Picture 1: Traditional Classroom

Text

- Static: Photocopy on transparency
- Editable: transparency, pen or chalkboard

Drawbacks

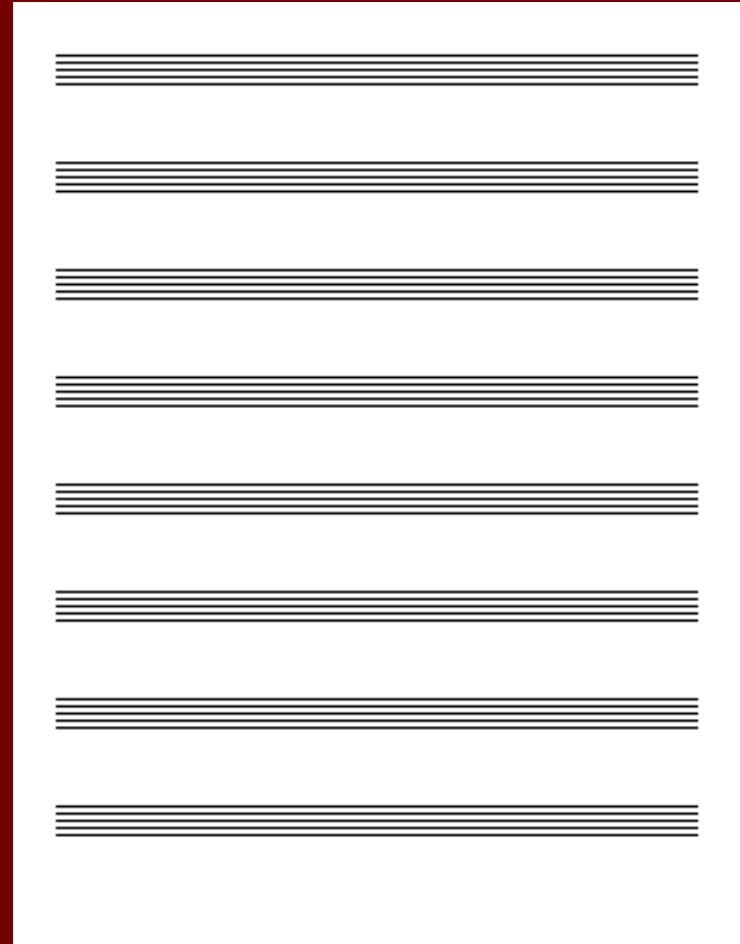
- Hard to read if hand-written
- Not persistent



Picture 1: Traditional Classroom

- ✍ Editable notation
 - transparency with lines and pen
 - or chalk board

- ✍ Drawbacks
 - always messy
 - hard to read



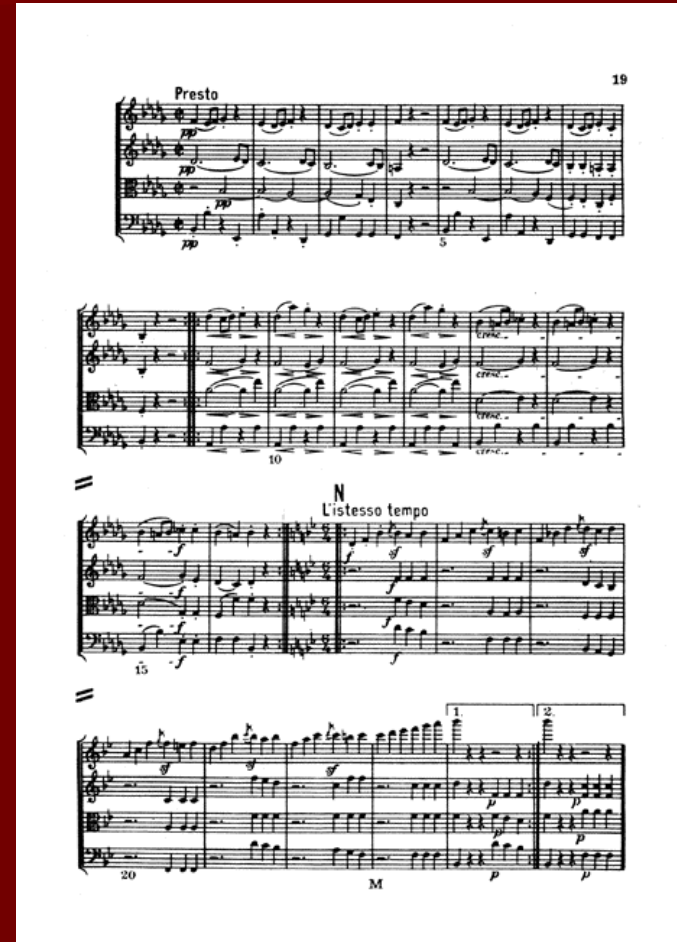
Picture 2: Hi-tech Classroom

- ✍ Audio
 - Play from Variations



Picture 2: Hi-tech Classroom

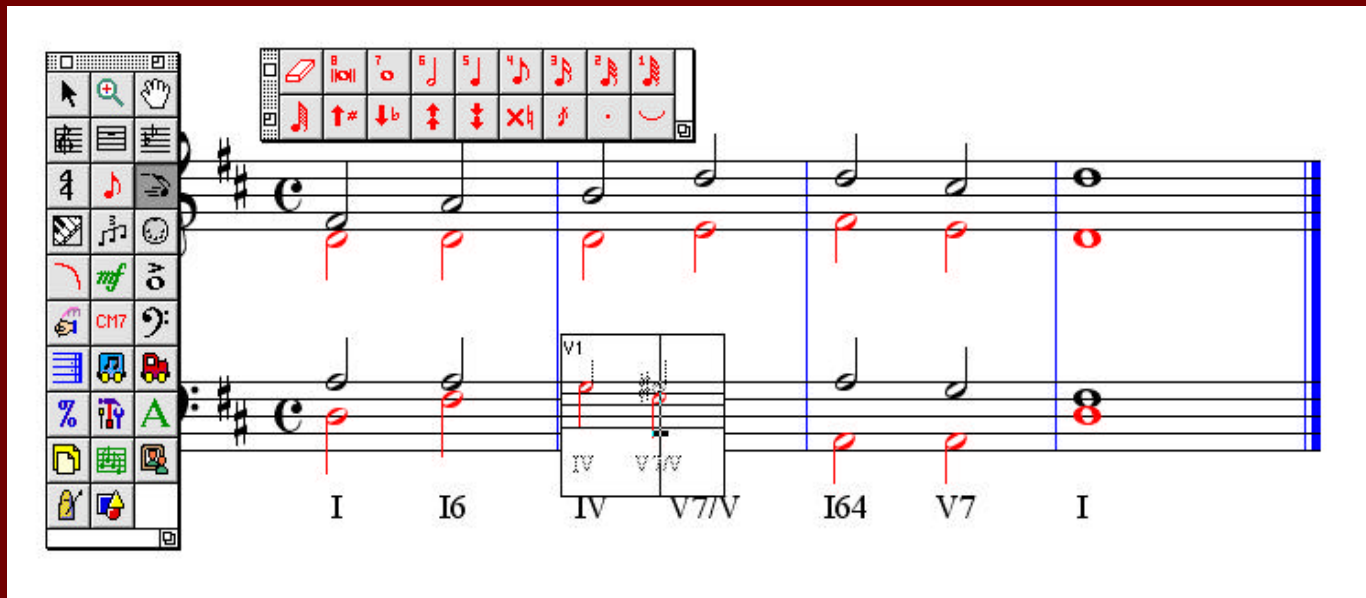
- ✍ Music scores
 - Scanned images
 - Document camera
- ✍ Drawbacks
 - Can be hard to read
 - Annotations “permanent”



Picture 2: Hi-tech Classroom

- ✎ Editable notation
 - Music editing software

- ✎ Drawbacks
 - Clunky interface for classroom presentation
 - Poor support for music analysis, annotation



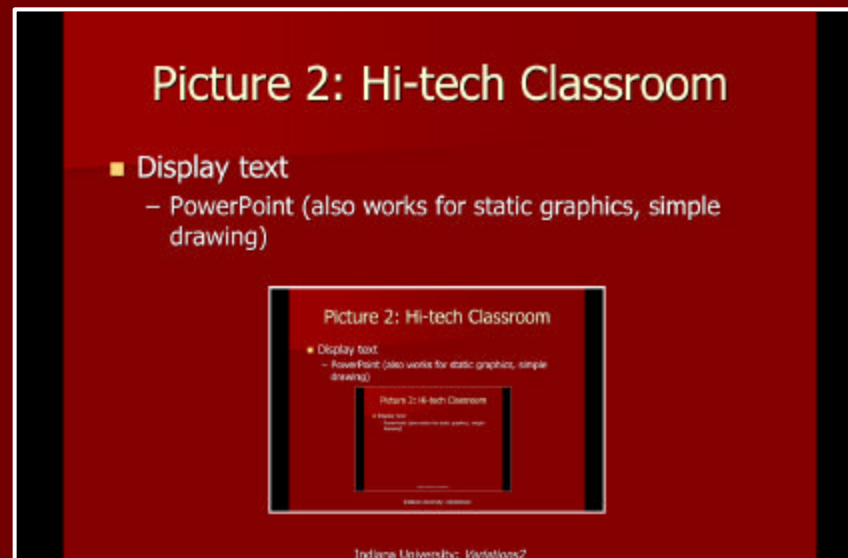
Picture 2: Hi-tech Classroom

- ✍ Other music visualizations
 - Drawing applications or tools

Picture 2: Hi-tech Classroom

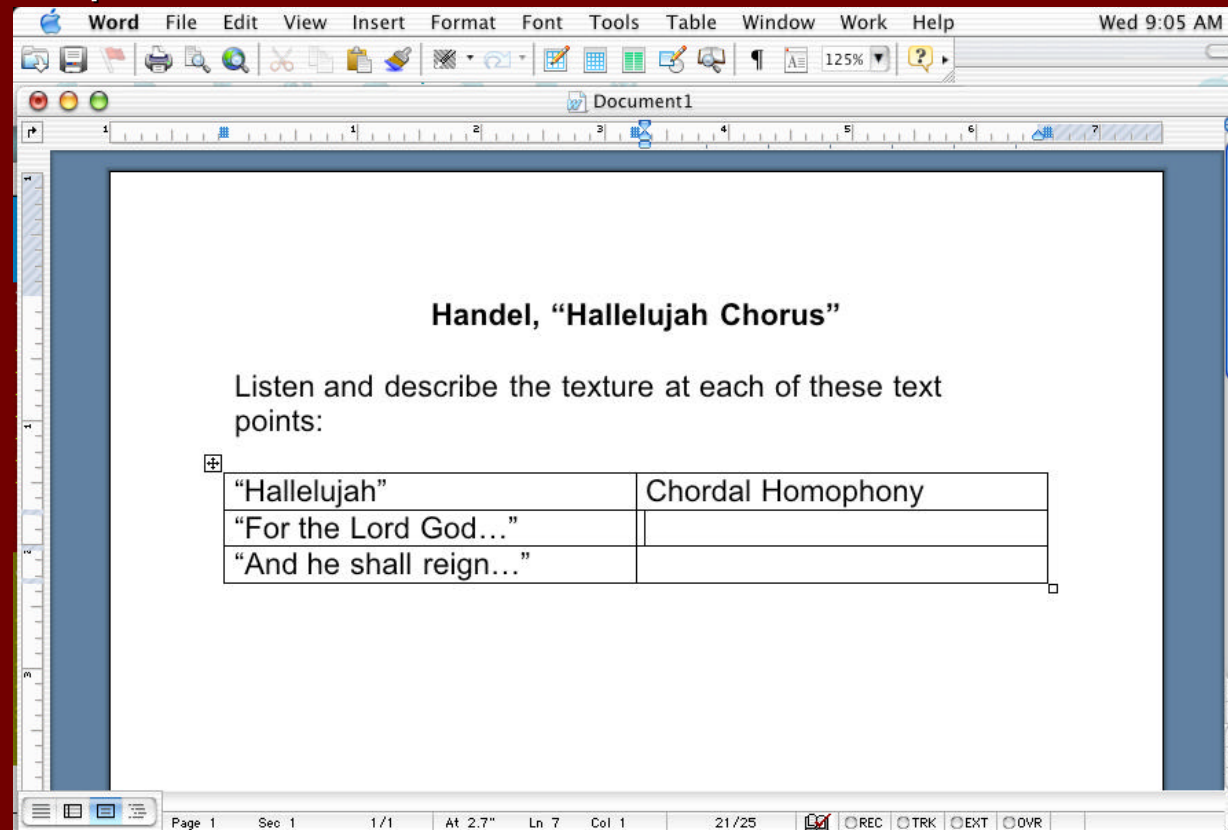
✍ Static text

- PowerPoint (also works for static graphics, simple drawing)



Picture 2: Hi-tech Classroom

- ✎ Editable text
 - Word processor

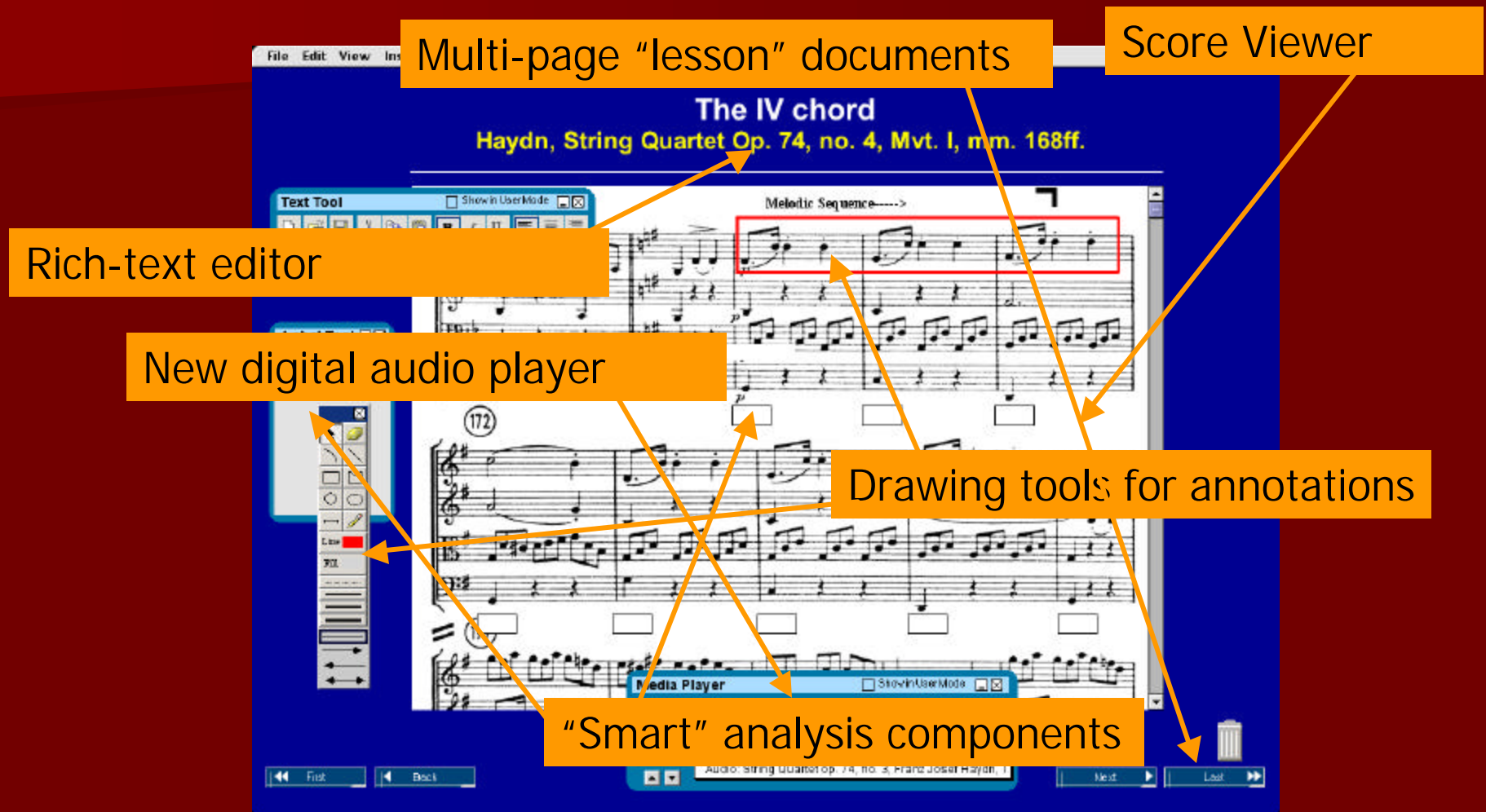


Picture 2: Hi-tech Classroom

Drawbacks

- Requires multiple applications
- No coordination between components
- Most domain-specific aspects difficult to implement
- Difficult for “normal” users to support all functions

Picture 3: Variations2 Classroom



Picture 3: Variations2 Classroom

The screenshot displays the Variations2 Classroom software interface. At the top left, a portrait of Johann Sebastian Bach is shown next to the title "Johann Sebastian Bach 'In meines Herzens Grunde'". A "Media Player" window is open in the top right corner, showing playback controls and a progress bar. The main interface features a "Phrases" section with a timeline of colored bubbles (blue, green, orange) and labels "a", "b", "c". Below this is a "Cadences" section with labels "PAC", "PAC", and "HC". A "Form diagram" section is visible, containing buttons for "Form diagram", "Melodic Dictation", "Scale Degrees", "Texture / Orchestration", and "Submit Answers". A "Note Palette" is located on the right side, showing various musical notes. At the bottom, a "Play Melody" button and a "Reset" button are present, along with a musical staff displaying a melody. Three orange callout boxes with arrows point to specific features: "Timeliner" points to the phrase bubbles, "Music Notation Editor (can display encoded scores)" points to the note palette, and "Synchronized graphics and text" points to the musical staff.

File

Johann Sebastian Bach
"In meines Herzens Grunde"

Media Player

Elapsed Time: 0:00 0:55

Phrases

Timeline

Cadences

PAC PAC HC

(Use the media player to listen to the entire excerpt, or click on a phrase bubble to hear just that phrase.)

Form diagram Melodic Dictation Scale Degrees Texture / Orchestration Submit Answers

phrase by selecting values from the note palette

Press "Reset" to clear your work and start again.

Play Melody Reset

Note Palette

Timeliner

Music Notation Editor (can display encoded scores)

Synchronized graphics and text

Picture 3: Variations2 Classroom

The screenshot displays the Variations2 Classroom interface. At the top, a window titled "Wolfgang Amadeus Mozart Fantasia in C minor, K. 475 mm. 83-98" is open. To its right is a "Media Player" window showing "Elapsed Time: 0:15" and a progress bar. Below these is a table with four columns and three rows. The first row is labeled "Phrases" and contains four boxes: "a" with a green checkmark, "a'" with a green checkmark, "a*" with a green checkmark, and "b" with a red X. The second row is labeled "Bubbles" and contains four blue curved lines. The third row is labeled "Cadences" and contains four boxes: "HC" with a green checkmark, "IAC" with a red X, "HC" with a green checkmark, and "PAC" with a green checkmark. Below the table is a note: "(Use the control buttons to listen to the entire excerpt, or click on a phrase bubble to hear just that phrase.)". Below the note is a tabbed interface with tabs: "Entire Excerpt", "Phrase 1", "Phrase 2", "Phrase 4", and "Check/Reset Answers". The "Check/Reset Answers" tab is selected. It contains a section titled "Check your answers or press 'Reset' to start over." with "Check Answers" and "Reset" buttons. Below this is a section titled "Your answers are now marked. Review items in detail by clicking on the corresponding item below." with a list of 10 items: 1. [2 out of 4 correct](#), 2. [3 out of 4 correct](#), 3. [Correct](#), 4. [0 out of 2 correct](#), 5. [Correct](#), 6. [Correct](#), 7. [Correct](#), 8. [Correct](#), 9. [Correct](#), and 10. [Correct](#). An orange arrow points from the "Check Answers" button to the "Check/Reset Answers" tab. Another orange arrow points from the "b" box in the "Phrases" row to the "Check/Reset Answers" tab. A third orange arrow points from the "Check/Reset Answers" tab to the "5. Correct" item in the list.

Question builder with built-in answer judging

The Multimedia Music Theory Teaching (MMTT) Project

Goals

- Environment that supports use of Variations2 content in teaching and learning
- Supports majority of current classroom instructional activities
- Supports greatly enhanced “critical listening” assignments

MMTT: Design Principles

- ✍ Ease of use
- ✍ Flexibility
- ✍ Component-based architecture
- ✍ Synchronization between any combination of components

PART IV

ISMIR: International Symposium on Music Information Retrieval

Annual Conferences

- ✍ October 2000, Plymouth, Mass.
- ✍ October 2001, Bloomington, Indiana
- ✍ October 13-17, 2002, IRCAM, Centre Pompidou, Paris
(<http://ismir2002.ircam.fr/>)

NSF Involvement

- ✍ Encouraged first meeting (OMRAS)
- ✍ Continuing financial support
- ✍ Sponsorship of several Music DL projects

PART V

Acknowledgements

Project Participants

- ✍ **PI:** Michael McRobbie
- ✍ **Project Management:** Gerald Bernbom, Jon Dunn
- ✍ **Steering Group:** Blaise Cronin, Gwyn Richards, Suzanne Thorin
- ✍ **Usability:** Andrew Dillon, Mark Notess
- ✍ **Copyright:** Kenneth Crews, Kristine Brancolini, Mary Wallace Davidson
- ✍ **Music Instruction:** Jay Fern, Roberta Lindsey
- ✍ **Music Theory:** Eric Isaacson
- ✍ **Metadata:** Mary Davidson, Harriette Hemmasi
- ✍ **System Design:** Jon Dunn, technical staff
- ✍ **Networks/Satellite Sites:** Douglas Pearson

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